Center Innovation Fund: ARC CIF

Free Space Optical Communications for Nanosats

Completed Technology Project (2016 - 2017)

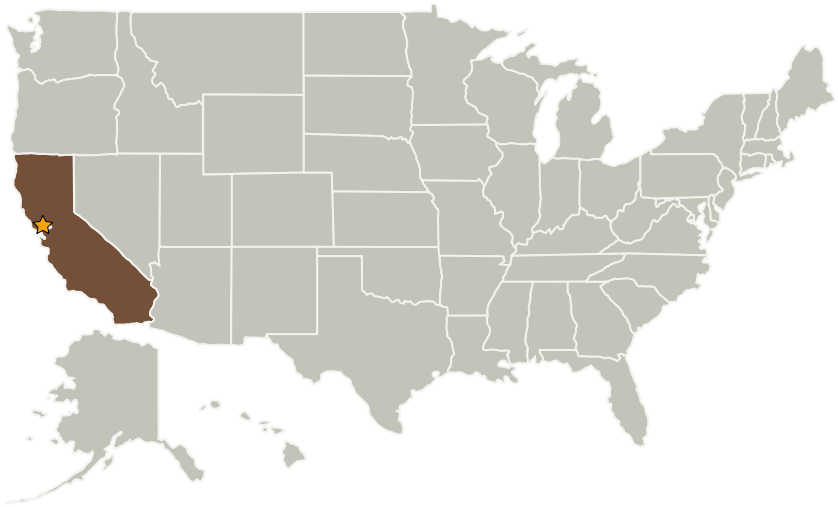
Project Introduction

We will develop this project in 3 stages: modeling, lab demo, and field testing. Modeling: We will create a model of the gray scale, in contrast to binary, data transmission problem. We will model the MRR contrast response versus voltages operation speed. We will include scintillation and atmosphere turbulence modeling for different air masses (i.e. atmosphere thickness crossed at a given angle). The outcome will be the optimal operational parameters.

Anticipated Benefits

Communications with nanosats, and in general, with any kind of spacecraft that does not have a high-gain directional antenna and associated pointing and power-generating capabilities, is limited to low data communication rates, hindering the quantity of information that can be downloaded. Enabling data intensive applications for nanosats, such as imaging, through the use of a power-efficient technology with minimal pointing requirements (tens of degrees), is potentially a game-changer

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California

Free Space Optical Communications for Nanosats

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

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Primary U.S. Work Locations

California

Project Management

Program Director:

Michael R Lapointe

Program Manager:

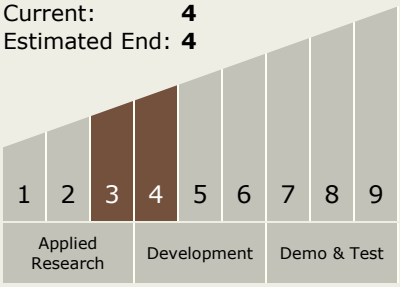
Harry Partridge

Principal Investigator:

Rodolphe Y De Jacquier-de Rosee

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.5 Revolutionary Communications Technologies
    - TX05.5.2 Quantum Communications

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Target Destination

Earth